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CASING HEAD FOR OIL WELLS

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Fig. 1

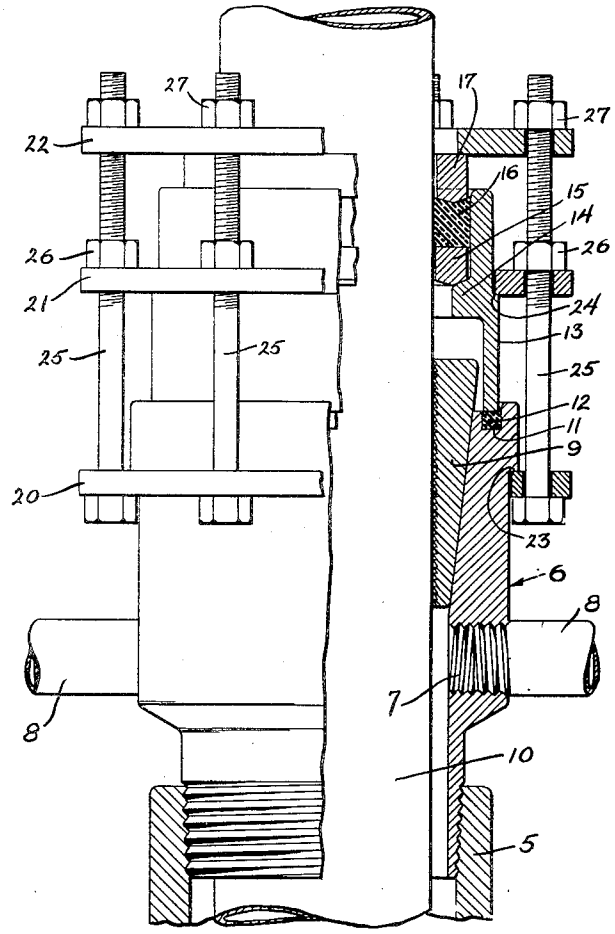
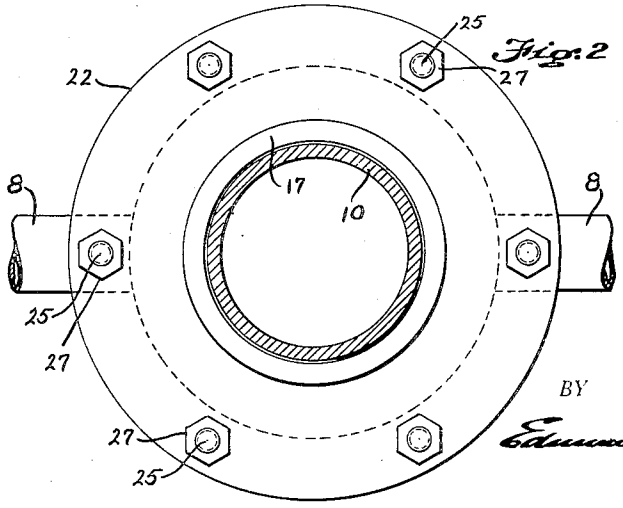


Fig. 2



INVENTOR.
WILLIAM D. SHAFFER

BY

Edmund A. Stevens

ATTORNEY.

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CASING HEAD FOR OIL WELLS

William D. Shaffer, Brea, Calif.

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8 Claims. (Cl. 166—14)

This invention relates more specifically to a vented casing head designed to carry and support an inner well casing in packed relation thereto.

An important object is to provide a vented well casing head provided with means for securely supporting an inner string of well casing therein at any desired point, and which may afterwards be quickly "packed off" in order that the gas between the casings may be effectively controlled.

A further object is to provide a compact mechanism so arranged that the packing means connected therewith may be readily assembled or renewed without disturbing the casing supported therein.

In the drilling of oil or gas wells several strings of well casings are generally employed, and it frequently happens that the driller is required to set the inner string at a certain place. Frequently he is unable to cut a piece of casing of the proper length, and further means must be provided to support and set the "string" at the desired place. Should there be gas between the outer and inner casings strings, packing must be provided for effectively packing the same between the strings.

By means of the present invention the above recited disadvantages are largely obviated, the driller being enabled to quickly set the string of inner casing at any desired point within the outer casing, and after such placement securely pack the space between the strings so that the gas may be effectively controlled.

Briefly the invention comprises a casing head provided with the usual vent openings for connecting thereto the usual gas and oil pipe lines, and having an interior bore merging into a conical bore at the upper end, the lower end being externally threaded for attaching the head to the upper end of a string of outer well casing. Segmental casing head slips provided with the usual teeth are carried in the conical portion of the casing head bore for supporting in the desired position a string of inner well casing.

In order to pack the space between the outer and inner strings of well casings a packing mechanism is provided, preferably consisting of a sleeve member having an internal annular flange for the reception of a split metal supporting ring. Disposed on this flange is an expansible packing ring adapted to be expanded into gas tight relation with the inner string of casing when the packing mechanism is clamped in position. The lower end of the sleeve member rests on a packing ring disposed on the upper end of the casing head and the packing ring in the sleeve carries a split metal ring for expanding the same.

The packing head, sleeve member, and the upper split ring all carry detachable flanges extending beyond the outer walls of said elements and are pierced for the reception of bolts that pass through the flanges, nuts engaging the bolts serve as a means for securely clamping the packing mechanism to the head and expanding the packings into gas tight relation with the head and inner string of casing.

From the above it will be apparent that the inner casing string may be readily suspended in the desired position within the outer string, and the packings may be assembled or renewed without disturbing the casing.

An embodiment of the invention is illustrated in the accompanying drawing which forms a part of the following specification, in which,

Fig. 1 is a front partially sectional elevation of the casing head attached to the upper end of a string of outer well casing showing an inner string supported therein in gas tight relation.

Fig. 2 is a top plan view of the above.

Referring now to the drawing 5 indicates the upper internally threaded end of a string of outer well casing, and 6 the casing head of cylindrical formation having a reduced lower end exteriorally threaded for engaging the upper threaded end of the well casing. Head 6 is provided with the usual vented openings 7 from which extend the usual gas and oil pipe lines 8, and is provided with an interior bore merging into a conical bore at its upper end for the reception of the usual toothed segmental casing slips 9, for supporting in position the inner string of well tubing 10. The upper end of the casing head has a circular groove 11 for the reception of a packing ring 12 formed of an expansible material, and mounted on the upper end of the head with its lower end resting on the packing ring 12 is a cylindrical sleeve 13, provided midway of its upper and lower ends with an interior annular flange 14, its upper surface being bevelled downwardly and forming a seat for a split metal ring 15. The under surface of ring 15 is bevelled downwardly from its inner and outer peripheral walls in order that it may be easily inserted in position. In order to provide sufficient space for the upper ends of the segmental casing supporting slips 9, the internal diameter of the lower end of the sleeve is greater than the upper end above the internal flange.

Disposed upon the split metal ring 15 is a pack-

ing ring 16 formed of an expansible material, such as rubber, that serves to pack the space between the inner casing and sleeve 13 when the same is expanded. Mounted on packing ring 16 is split metal ring 17 similar to ring 14 whose upper end projects beyond the upper end of the sleeve, the ring 17 serving to expand the packing ring 14 when pressure is exerted thereagainst by the clamping means.

The clamping means for expanding the packing ring 16 into engagement with the inner string of well casing, and the sleeve into engagement with the head, preferably consists of a plurality of detachable metal flange rings mounted on the casing head, sleeve, and upper split metal ring, bolts and nuts engaging the several flanges to securely clamp the sleeve to the head, and to expand the packing within the sleeve into gas tight relation with the inner casing. While I have shown and described bolts and nuts as a means for securing the packing mechanism to the casing head it will be understood that other similar means may be substituted therefor.

The clamping means above mentioned preferably consists of three detachable metal flange rings 20, 21, 22 all provided with a plurality of openings for the passage of bolts 23 therethrough. Ring 20 bears against an annular shoulder 23 formed on the outer surface of the casing head, while ring 21 rests on a similar shoulder 24 formed on the sleeve 13. The uppermost ring 22 is disposed on the upper surface of the split ring 17. Bolts 25 passing through the openings in the various rings, and nuts 26, 27 serve to clamp the rings together, at the same time expanding the packing ring 16 in gas tight engagement with the inner casing, and the lower end of the sleeve into gas tight engagement with the casing head.

In use the casing head is secured to the outer string of casing and the inner string is then set in the desired position and held in such relation by the slips 9, the sleeve 13 is then placed on the packing ring of the casing head body, the packing and split rings inserted in position and the whole tightly clamped together by means of the bolts and flange rings in gas tight relation to the head and inner casing.

From the above it will be clear that the objects of the invention are effectively accomplished, and that a gas tight connection is made between the inner and outer casings, further the said packing may be quickly assembled and adjusted without disturbing the setting of the casing.

What I claim is:

1. A casing head joint construction including a cylindrical body member having a bore therethrough, the upper circular end of the body having a groove formed therein, a packing element disposed in said groove, a substantially cylindrical sleeve member disposed in vertical alignment with the body with its lower end against said packing element, and detachable flanges engaging the body and sleeve members for clamping the sleeve to the body.

2. A casing head including a cylindrical body member having a bore therethrough, a packing disposed on the upper end of said body member, a sleeve carried on the upper end of said body and engaging the packing, a plurality of detachable flanges engaging the body and sleeve members, and means for forcing the flanges into clamped engagement with the body and sleeve members to secure the sleeve in gas tight engagement with said body member.

3. A casing head including a cylindrical member having a bore therethrough, a packing disposed on the upper end of said body member, a sleeve carried on the upper end of said body member and engaging said packing, a packing element carried by said sleeve and adapted to be expanded laterally, a plurality of detachable flanges engaging the body and sleeve, one of said flanges engaging the packing element, and means for forcing the flanges into clamped engagement with the elements with which they are associated to expand said last named element and to secure the sleeve in gas tight engagement with the body.

4. A casing head including a cylindrical body member having a bore therethrough, a packing disposed on the upper end of said body member, a sleeve carried on the upper end of said body and engaging the packing, an annular exterior flange seat formed on the sleeve and on the body member, a plurality of detachable flanges engaging the seats on the sleeve and body member, and means for forcing the flanges into clamped engagement with said seats to secure the sleeve in gas tight engagement with the body member.

5. In a packing head, the combination of a body, an outer string of casing, an inner string of casing, the body being threaded to the upper end of the outer string of casing, the body having a bore tapered for a portion of its length, slips mounted in the tapered portion of the bore to suspend the inner casing after a predetermined stretch has been pulled into the inner casing, an annular packing groove formed in the upper end of the body, packing positioned in said groove, a packing head cap having an annular sleeve fitting said annular groove to engage and compress the packing therein, a plurality of cap bolts adjustably secured to the cap and to the body for compressing the packing in the groove to form a fluid tight connection between the cap and the body, a packing gland formed in the cap, packing rings positioned in the packing gland, a cap gland follower having a downwardly depending annular skirt adapted to fit in the gland and compress the packing, and a plurality of bolts adjustably connecting said cap gland follower and the body of the packing head to compress the latter said packing rings to form a fluid-tight connection between the cap gland follower and the inner concentric casing.

6. In a packing head, the combination of a body, an outer string of casing, an inner string of casing, the body being threaded to the upper end of the outer string of casing, the body having a bore tapered for a portion of its length, slips mounted in the tapered portion of the bore to suspend the inner casing after a predetermined stretch has been pulled into the inner casing, an annular packing groove formed in the upper end of the body, packing positioned in said groove, a packing head cap having an annular sleeve fitting said annular groove to engage and compress the packing therein, a plurality of cap bolts adjustably secured to the cap and to the body to compress the packing in the groove to form a fluid tight connection between the cap and the body, a packing gland formed in the cap, packing rings positioned in the packing gland, a cap gland follower having a downwardly depending annular skirt adapted to fit in the gland and to compress the packing against the inner concentric casing, and means for adjustably clamping the cap gland follower to the body of the packing head.

7. In a packing head, the combination of a body, an outer string of casing, an inner string of

casing concentrically positioned within the outer string of casing, means for securing the body to the upper end of the outer string of casing, sectional slips mounted in the bore of the body to suspend the inner concentric casing after a predetermined stretch has been pulled in the inner concentric casing, an annular packing groove formed in the upper end of the body, packing positioned in said groove, a packing head cap having an annular sleeve fitting said annular groove to engage the packing therein, means for clamping the cap to the body to compress the packing in said groove to form a fluid-tight connection between the cap and the body, a packing gland formed in the cap, packing positioned in the packing gland, a cap gland follower having a downwardly depending annular skirt adapted to fit in the gland, and means for adjustably clamping the cap gland follower to the body of the packing head to compress the packing in the packing gland to form a fluid-tight connection between the cap gland follower and the inner concentric casing.

8. In a packing head, the combination of a body, an outer string of casing, an inner string of casing concentrically mounted within the outer string of casing, means for securing the body to the upper end of the outer string of casing, the body having a bore tapered for a portion of its length, slips mounted in the tapered portion of the bore to suspend the inner concentric casing after a predetermined stretch has been pulled in the inner concentric casing, a packing head cap, packing positioned between the packing head cap and the upper end of the body, means for adjustably clamping the packing head cap to the body to compress and expand the said packing, a packing gland formed in the cap, packing positioned in the packing gland, a cap gland follower provided with means for engaging the packing in the packing gland, and means for adjustably clamping the cap gland follower to the body to compress the latter said packing to form a fluid-tight connection between the cap gland follower and the inner concentric casing.

WILLIAM D. SHAFFER.